

Basic Best Management Practice Specifications for the West Virginia Runoff
Volume Reduction Requirements

General Criteria for extended filtration practices:

- Minimum soil infiltration rate ≥ 0.52 "/hr as determined by soil types (Loam) or HSG B to eliminate the underdrain and achieve 100% reduction.
- When underdrain is used, a minimum of 12" stone sump under the underdrain must be provided

1. Vegetated Roof

- Depth of media up to 8 inches plus drainage layer.
- Vegetated roof must conform with ASTM (2005) International Green (Vegetated) Roof Standards.

2. Impermeable Surface Disconnection

a) Simple Disconnection to HSG A/B soils (rooftop or non-rooftop impervious)

- Maximum impervious area treated: 1,000 ft² per disconnection
- Maximum contributing flow path (impervious) length: 75 ft.
- Maximum disconnection length: length of longest contributing flow path
- Minimum disconnection length: 40 ft.
- Minimum disconnection width: width of level spreader plus 50% or a Maximum of 25 ft..
- Maximum disconnection slope: $\leq 2\%$; or $\leq 5\%$ with turf reinforcement
- Minimum setback from buildings: >5 ft; >15 in karst or where grade is less than 1%

b) Amended Filter Path for HSG C/D Soils

- Same dimensions as above
- Compost amendments added to downspout filter path minimum 10 ft width.

c) Residential Rain Garden

- Maximum impervious area treated: 1,000 square feet
- Maximum surface ponding depth: 12 inches
- Minimum soil infiltration rate: 0.5 inches / hour or use underdrain with 12" minimum depth gravel sump
- Minimum filter media depth: 18 inches

d) Rainwater Harvesting

- Runoff reduction credits are based on the total amount of annual internal water reuse, outdoor water reuse, and tank dewatering discharge calculated to be achieved by the tank system using the Cistern Design Spreadsheet, which can be accessed here:
<http://www.vwrrc.vt.edu/swc/NonProprietaryBMPs.html> (Note: This program is a very large file (215 MB))

e) Stormwater Planter

- Maximum ponding depth: 12 inches
- Minimum filter depth: 24 inches

Basic BMP Sizing Specifications for the West Virginia Runoff Volume Reduction Spreadsheet Exercise

3. Permeable Pavement
 - Minimum soil infiltration rate: 0.5 inches / hour; or
 - Use underdrain with 12” minimum depth gravel sump; or
 - Provide a 48 hr drawdown of the stone storage reservoir by using a control structure on the underdrain.
 - Stone reservoir has a porosity of 0.4
 - The maximum ratio of external contributing impervious surface to permeable pavement is 2:1.
 - Maximum pavement slope: 5%
 - Drainage area should consist of impervious cover only

4. Grass Channel
 - The bottom width of the channel: 4 ft to 8 ft wide.
 - The channel side-slopes: 3H:1V or flatter.
 - The longitudinal slope of the channel should be no greater than 4%. (Check dams may be used to reduce the effective slope in order to meet the limiting velocity requirements.)
 - The maximum total contributing drainage area to any individual grass channel is 5 acres.
 - The maximum flow velocity of the channel must be less than 1 foot per second during a 1-inch storm event.
 - The dimensions of the channel should ensure that flow velocity is non-erosive during the 2-year and 10-year design storm events and the 10-year design flow is contained within the channel (minimum of 6 inches of freeboard).

5. Dry Swale
 - Effective swale slope must be $\leq 1\%$. Check dams may be used to create the effective slope (maximum recommended ponding depth of 12 inches behind check dams).
 - Check dams may be used to create surface storage volume
 - Filter media depth: 24 – 36 inches
 - Minimum soil infiltration rate: 0.5 inches / hour or use underdrain with 12” minimum depth gravel sump below underdrain.
 - Pretreatment required:
 - Forebay
 - Grass filter strip
 - Gravel diaphragm level spreader.
 - Flows from larger storm events may be conveyed through the dry swale if sufficient conveyance capacity is provided.

Basic BMP Sizing Specifications for the West Virginia Runoff Volume Reduction Spreadsheet Exercise

6. Bioretention
 - Maximum contributing drainage area: 2.5 acres
 - Maximum ponding depth: 12 inches
 - Minimum filter depth: 24 in.; maximum 36 in. Additional storage can be provided in the form of chambers or perforated pipe under the soil media.
 - Minimum soil infiltration rate: 0.5 inches / hour or use underdrain with 12" minimum depth gravel sump below underdrain.
 - Pretreatment required:
 - Forebay
 - Grass filter strip
 - Gravel diaphragm level spreader.

7. Infiltration
 - Minimum soil infiltration rate: 0.52 inches / hour (HSG B)
 - A minimum of 2 feet is required between the bottom of the infiltration practice and the seasonal high water table or bedrock.
 - The treatment volume (runoff from the 1" storm) must infiltrate within 48 hours.
 - Pretreatment required:
 - Forebay
 - Grass filter strip
 - Gravel diaphragm level spreader.

8. Extended Detention Pond
 - Pretreatment required: forebay micropool
 - Length/width ratio or flow path must be at least 3:1.
 - 12-hour extended detention time for the runoff reduction volume. (Will typically require an outlet micropool or other measure to prevent clogging.)

9. Sheet Flow to Filter / Open Space
 - The maximum contributing impervious area to any individual vegetated filter strip is 5,000 square feet.
 - Minimum length of filter (in direction of flow): 50 feet
 - Maximum slope: 6%. (2% for the first 10 feet)
 - Inflow must be from sheet flow or via a level spreader.
 - Maximum contributing sheet flow length:
 - 150 feet from adjacent pervious areas;
 - 75 feet from adjacent impervious areas.
 - Contributing concentrated flow must have a level spreader with a minimum width:
 - 13 linear feet per cfs of flow if conservation area is open space/meadow;
 - 40 linear feet per cfs of flow if conservation area is forested.
 - Runoff reduction credit applies only to areas directly contributing sheet flow or directly perpendicular to the level spreader.